

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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SPRINT SPECTRUM L.P., SPRINTCOM, :
INC. and SPRINT/UNITED :
MANAGEMENT COMPANY, :
 : Case No.
Plaintiffs, :
 : **DECLARATION OF JAY BLUHM**
-against- :
 :
AT&T INC., :
 :
Defendant. :
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I, Jay Bluhm, make this declaration under 28 U.S.C. § 1746 and state that:

1. I am Vice President, Network Development and Engineering at Sprint/United Management Company. I make this declaration in support of Plaintiffs Sprint Spectrum L.P.’s, SprintCom, Inc.’s, and Sprint/United Management Company’s (collectively “Sprint”) motion brought by order to show cause for a temporary restraining order and a preliminary injunction against Defendant AT&T Inc. (“AT&T”). I have personal knowledge of the following facts and, if called upon as a witness, could and would competently testify thereto.

2. In my capacity as Vice President, Network Development and Engineering, I am intimately involved with Sprint’s wireless network planning and development, which includes the engineering, development, deployment, and optimization of new and current technologies on Sprint’s wireless network. I am charged with understanding the international standards for wireless technology, including the technological requirements for each standard that is released. In my role, I am also familiar with the technology on which the networks operated by other wireless carriers currently rely, with the different strategies available for developing a 5G wireless network, and with the hardware and software necessary for a 5G wireless network. I am

also responsible for implementing Sprint's plans for deploying its 5G wireless network. As a result, I am aware of the amount of time and money Sprint has invested in its own 5G wireless network.

3. I have worked at Sprint for more than 20 years, during which time I have held various titles, including Vice President, Network Planning—Strategy, Planning and Development and Vice President, Network Development and Engineering—Network. I also serve on the Board of Directors for key wireless industry organizations, including as Vice Chairman of the Competitive Carriers Association and as Treasurer of the Alliance for Telecommunications Industry Solutions.

4. I have a Bachelor of Science degree in Engineering from South Dakota State University and am a licensed engineer.

The Third Generation Partnership Project (“3GPP”)

5. The Third Generation Partnership Project (“3GPP”) is an international body that formulates uniform, objective industry standards for wireless technology.

6. Each major step forward in wireless cellular technology is known as a “generation,” and each official publication of new industry standards issued by 3GPP is called a “Release.”

7. The generation and Release labels—such as 3G, 4G LTE, and 4G LTE Advanced (discussed below)—ensure transparency and fairness in the wireless industry, because they denote verifiable technological features of a wireless network. Wireless carriers label their networks with 3GPP designations to set their networks apart from their competitors' networks. Industry analysts, the media, and consumers rely on these 3GPP designations in assessing whether the sophistication and reliability of one wireless carrier's network is better than that of its competitor's.

The Generation System of Networks

8. 3GPP has established specifications for third generation (or 3G) technology, fourth generation (or 4G) technology known as Long Term Evolution (or 4G LTE), and later iterations of 4G technology, such as 4G LTE Advanced, with each subsequent generation a technological improvement over the prior.

9. 4G LTE was first introduced in 3GPP Release 8. 3GPP Releases 10, 13, and 14 include 4G LTE Advanced technologies for increasing the capacity and speed of 4G LTE networks, such as carrier aggregation, 4×4 MIMO, and 256 QAM.

10. Carrier aggregation refers to the increase in bandwidth available when multiple bands of spectrum are bonded together to create wider channels and produce more capacity and faster speeds on capable devices. Carrier aggregation essentially creates a wider lane that allows more traffic to travel at higher rates.

11. MIMO, or “multiple input multiple output,” is an antenna technology that refers to the use of multiple antennas at the source (or transmitter) and multiple antennas at the destination (or receiver) of data. MIMO allows the sending and receiving of more than one data signal simultaneously over the same radio channel by exploiting multipath propagation. An increased number of antennas at the source and destination results in fewer data transmission errors and higher transmission speeds. The “4x4” in 4x4 MIMO refers to four transmit antennas and four receive antennas.

12. 256 QAM or “256 quadrature amplitude modulation” is a technique that increases the amount of data that can be transmitted at any given time over a given amount of bandwidth, which results in faster data speeds and more efficient use of this bandwidth.

13. Today, each of the four Tier 1 wireless service providers—AT&T, Verizon, T-Mobile, and Sprint—operates a 4G LTE wireless network that fits the 3GPP’s specifications for

a 4G LTE network and, where available, a 4G LTE Advanced network. Where 4G LTE Advanced technology is unavailable, the wireless service providers operate on 4G, 4G LTE, or 3G technology.

The Transition From 4G LTE Advanced To 5G

14. 3GPP Release 15 sets forth the first specifications for 5G, the fifth generation of wireless networks, with the goals of faster speeds, decreased latency, and increased network capacity. Release 15 describes a new air interface between mobile devices and cell towers that supports multiple different types of subcarrier spacing (instead of the one type of subcarrier spacing supported by 4G LTE). This allows for more flexible deployments covering a wider range of services and the use of additional spectrum in bands that have never before been used for commercial data traffic, which in turn will significantly increase capacity. Additionally, Release 15 defines an advanced version of traditional MIMO technology, called Massive MIMO, that uses multiple transmitters and receiving in a minimum 16x16 array for delivering higher capacity, spectral efficiency, and faster speeds.

15. A true 5G network, meaning one that adheres to 3GPP Release 15's specifications, requires drastic hardware and software updates to any existing 4G system. This includes, for example, adding 5G-enabled radios and additional antennas to cell towers and other cell sites. Those carriers that will use an extremely high frequency millimeter wave spectrum (which cannot travel as far or through as many objects as lower frequency spectrum) for their 5G wireless networks have to install more cell sites for their radios and antennas in order to provide broad and contiguous 5G coverage.

16. A true 5G network also requires updated hardware and software for consumers' phones, tablets, and other wireless devices. In order to receive the benefits of a 5G network, wireless service providers will need to offer consumers 5G-enabled phones and tablets that have

faster processors and more antennas than those used in currently-available, 4G LTE-enabled devices. Additionally, those mobile devices will need to be equipped with the software required to allow them to communicate with the 5G-enabled radios on cell towers.

17. The transition to 5G will be the most drastic upgrade in mobile wireless technology in nearly a decade. Currently, consumers can not yet enjoy the benefits of a wireless 5G network. No wireless service provider has yet to complete the tasks necessary to offer consumers the full benefits of a broad, contiguous 5G network. There are no 5G-enabled mobile phones, tablets, or other devices available to consumers. No service provider has finished upgrading all of its cell sites with the requisite 5G radios for consumers to access the 5G network seamlessly as they travel within an individual market, let alone across the country. And no service provider has released the software necessary for future 5G mobile devices and 5G cell sites (once they are equipped with 5G radios) to talk to each other.

AT&T Operates On A 4G LTE Advanced Network

18. The network that AT&T is calling “5GE” (or “5G Evolution”) relies entirely on technology first detailed in 3GPP’s Release 13 specification, or prior. These specifications and enhancements are regarded by 3GPP and the wireless industry as 4G LTE Advanced technology.

19. In my role at Sprint, I am required to keep abreast of technological developments in the wireless industry, including those advancements made by Sprint’s competitors. Based on this, I am aware that AT&T’s phones currently on the market, like all other mobile phones on the market, lack the capacity to realize the additional benefits of a 5G wireless network. For example, they do not contain the requisite processors or antennas to receive, transmit, or process data at the speeds that can be achieved on legitimate 5G wireless networks. I am also aware that AT&T has yet to deliver a contiguous mobile 5G network, nor has AT&T made it possible for wireless customers to experience the added benefits of a mobile 5G network anywhere.

20. I am aware that AT&T has pushed a software update to consumers to change the icon on some of its customers' mobile devices to read "5GE" instead of "LTE" when those devices are connected to AT&T's 4G LTE Advanced network. AT&T's deceptive use of a "5GE" icon on phones that are actually connected to its 4G LTE Advanced network makes it appear that AT&T is operating on a more technologically advanced network than it is. Further, once true, standards-based 5G is available on AT&T's mobile devices, AT&T's "5GE" icon will obfuscate the switch between the 4G LTE Advanced and 5G networks, making it appear as though AT&T's 5G footprint is more robust than it is. Based on my experience maintaining Sprint's wireless network, which includes designing and pushing out software updates to mobile devices that operate on Sprint's network, AT&T can remove this "5GE" icon with a simple software update, just as it appeared in the first place.

21. Moreover, AT&T's false characterization of its 4G LTE Advanced network as 5G erodes the authority of the specifications set by 3GPP.

Sprint's Forthcoming 5G Network

22. Sprint's initial 5G deployment plan will focus on population-dense metropolitan areas, including New York City. During the current fiscal year, Sprint already has invested several billion dollars on network upgrades, including 5G hardware upgrades (such as installing hardware, like Massive MIMO antenna deployments and 5G radios, in its cell towers) to its 4G LTE network in those metropolitan areas. It recently completed the world's first over-the-air 5G data transmission using 2.5 GHz and Massive MIMO on Sprint's live commercial network, marking a significant milestone on its path toward launching wireless 5G service.

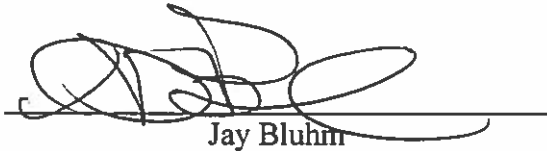
23. Sprint has also spent approximately two years developing, in connection with third-party original equipment manufacturers, its 5G-enabled mobile phones. It expects to offer its first 5G-enabled mobile phone in the first half of 2019, with a second phone expected shortly

thereafter. Also in 2019, Sprint expects to launch a true, standards-based 5G wireless network in nine cities, including New York City. Once this happens, consumers with 5G-enabled phones will be able to connect to and receive the full benefits of Sprint's standards-based 5G wireless network in those cities.

24. Starting with its initial nine cities, Sprint is currently positioned to be an early—and possibly the first—provider of a wireless 5G network with 5G-enabled mobile devices that can connect to and reap the benefits of that network.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: February 6, 2019
Overland Park, Kansas



Jay Bluhm